



**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

**In re Application of:**

Terry L. Gilton

**Serial No.:** 09/177,814

**Filed:** October 23, 1998

**For:** SEPARATION APPARATUS  
INCLUDING POROUS SILICON COLUMN

**Confirmation No.:** 3621

**Examiner:** N. Yang

**Group Art Unit:** 1641

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**APPEAL BRIEF**

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Attn: Board of Patent Appeals and Interferences

Sirs:

This APPEAL BRIEF is being submitted in the format required by 37 C.F.R.

§ 41.37(c)(1), with the fee required by 37 C.F.R. § 41.20(b)(2).

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I. REAL PARTY IN INTEREST

U.S. Application Serial No. 09/177,814 (hereinafter “the ‘814 Application”), the application at issue in the above-referenced appeal, has been assigned to Micron Technology, Inc., as evidenced by the assignment that has been recorded with the U.S. Patent & Trademark Office (hereinafter “the Office”) at Reel No. 9551, Frame No. 0837. Accordingly, Micron Technology, Inc., is the real party in interest in the above-referenced appeal.

II. RELATED APPEALS AND INTERFERENCES

Neither Appellants nor their attorneys of record are aware of any appeals, interferences, or other proceedings that would affect the decision of the Board of Patent Appeals and Interferences (hereinafter “the Board”) in the above-referenced appeal.

III. STATUS OF CLAIMS

The ‘814 Application was filed with one-hundred ten (110) claims on October 23, 1998.

Claims 2, 12, and 30-110 have been canceled without prejudice or disclaimer. New claims 111 and 112 have been added.

Thus, claims 1, 3-11, 13-29, 111, and 112 remain pending in the above-referenced application. No claim has been allowed. Accordingly, the final rejections of claims 1, 3-11, 13-29, 111, and 112 are being appealed.

IV. STATUS OF AMENDMENTS

On October 23, 1998, the ‘814 Application was filed with one-hundred ten (110) claims.

On July 7, 1999, a restriction requirement was made over the telephone, as was a provisional election in response to the restriction requirement.

An action on the merits of the elected claims quickly followed the restriction requirement, on July 21, 1999. That action was followed by an Amendment, which was mailed on October 12, 1999, and received and filing date of October 18, 1999. In that amendment, claims 75-104 and 108-110, which were withdrawn from consideration, were canceled without prejudice or disclaimer, as were claims 2 and 65. Several claim revisions were also presented, as were explanations as to the patentability of claims 1, 3-64, 66-74, and 105-107 over the art upon which the Examiner had based her rejections.

Despite the reasoning that accompanied the Amendment of October 18, 1999, the Examiner maintained most of her claim rejections, including all of the prior art rejections of the claims, in a final Office Action that was mailed on January 3, 2000. On March 3, 2000, an Amendment under 37 C.F.R. 1.116 was filed, in which additional claim revisions were presented and the prior explanations as to the patentability of the claims that remained pending were expanded upon.

The Examiner refused to consider the additional explanations, as evidenced by an Advisory Action dated April 13, 2000. In response to the Advisory Action, a Continued Prosecution Application (CPA) was filed on April 18, 2000, with a petition and the appropriate fee for a one month extension of time.

The CPA was followed on May 24, 2000, by a non-final action on the merits of the then-pending claims, in which a number of new grounds of rejection were presented. On August 24, 2000, another Amendment was mailed. That Amendment received a filing date of

August 29, 2000. In that Amendment, further claim revisions were presented, including the cancellation of claims 12, 45, and 47 without prejudice or disclaimer. The new grounds of rejection were also addressed by providing detailed arguments as to the patentability of the claims over the art upon which the Examiner had relied.

While one ground of rejection was withdrawn by the Examiner, the majority of the claim rejections were maintained in a final Office Action mailed on February 16, 2001. The final Office Action was followed on April 16, 2001, by another Amendment under 37 C.F.R. § 1.116, in which a further claim amendment was presented along with additional arguments as to the patentability of the claims over the art upon which the Examiner had based her rejections.

On May 11, 2001, the Examiner withdrew the finality of her prior rejections and presented a number of new grounds for rejecting the claims that remained pending. Nonetheless, each of the claims that remained pending and under consideration at that time, including claims 1, 3-11, 13-44, 46, 48-64, 66-74, and 105-107, was again rejected. In response, another Amendment was filed on July 30, 2001.

Despite the additional changes to the claims and reasoning that were presented in the July 30, 2001, amendment, all of the claim rejections that were presented in the Office Action of May 11, 2001, were maintained in a final Office Action that was mailed on October 10, 2001. A response to the Final Office Action of October 10, 2001, was filed on December 11, 2001.

Having deemed some of the remarks in the December 11, 2001, response persuasive, the Office withdrew the finality of the October 10, 2001, Final Office Action and issued a non-final Office Action on January 23, 2002. In that Office Action, claims 105-107 were allowed and an indication was made that claims 33, 63, and 74 recited allowable subject matter. In addition,

several of the prior rejections were withdrawn. Nonetheless, claims 1, 3-11, 13-32, 34-44, 46, 48-62, 64, and 66-73 were rejected. On April 23, 2002, another response was filed. In that response, the indication of allowable subject matter was acknowledged and remarks were provided as to the patentability of the remaining subject matter.

Another non-final Office Action was mailed on July 10, 2002. In addition to maintaining all of the rejections from the previously Office Action, the Examiner provided new grounds for rejecting the claims that she had previously indicated to be allowable. Another response was filed on October 15, 2002.

Thereafter, on January 16, 2003, another final Office Action was mailed. While each of claims 1, 3-11, 13-44, 46, 48-64, 66-74, and 105-107 was still rejected, some of the rejections were withdrawn. One last effort was made to convince the Examiner of the patentability of claims 1, 3-11, 13-44, 46, 48-64, 66-74, and 105-107 in a response dated March 20, 2003.

Nonetheless, the Examiner elected to maintain all of the then-pending rejections in an Advisory Action mailed on April 7, 2003.

Upon receiving the Advisory Action, a Notice of Appeal was filed on April 15, 2003, and was filed by a Brief on Appeal, which received a filing date of May 27, 2003.

After receiving and considering the Brief on Appeal, the Examiner withdrew her rejections, allowed claims 33, 63, 74, and 105-107, and, once again, presented new grounds of rejection against the remaining claims in a non-final Office Action dated October 21, 2003. On January 26, 2004, another Amendment was filed. In addition to presenting additional claim revisions, detailed reasoning as the allowability of the rejected claims was provided.

On April 19, 2004, after years of prosecution on the merits and despite the Examiner's indication that several claims were allowable, another restriction requirement was presented. A Response to the restriction requirement was filed on May 10, 2004, resulting in the withdrawal of claims 30-44, 46, 48-64, 66-74, and 105-107 from consideration.

The restriction requirement was followed by a final action on the merits of claims 1, 3-11, and 13-29, which was mailed on July 27, 2004. Many of the previous grounds of rejection were maintained in the final Office Action. On September 30, 2004, another Amendment under 37 C.F.R. § 1.116 followed the final Office Action.

The Examiner responded by issuing an Advisory Action on January 26, 2005. As amendments to the claims had been proposed in the Amendment under 37 C.F.R. § 1.116, a Request for Continued Examination (RCE) was filed on February 17, 2005, along with a Petition to Revive an Unintentionally Abandoned Application and the appropriate fees.

The Petition to Revive was granted on April 4, 2005, and was followed on May 3, 2005, by a new non-final action on the merits, in which totally new grounds for rejecting claims 1, 3-11, and 13-29 were presented by a newly assigned examiner. Thereafter, on August 1, 2005, another Amendment was filed. Several broadening amendments were made to the claims, and new claims 111 and 112 were added.

Apparently, the new Examiner was convinced by the reasoning that was presented in the Amendment of August 1, 2005, as new grounds of rejection were presented in a final Office Action that was mailed on November 1, 2005. Explanations as to the impropriety of the new, final grounds of rejection were set forth in a Response to Final Office Action filed January 9, 2006, but were disregarded in an Advisory Action dated February 6, 2006.

A Notice of Appeal was filed on March 1, 2006, and is followed by this Appeal Brief, which is being submitted on May 1, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention disclosed in and recited in the claims of the '814 Application includes separation apparatus, including miniature chromatographs, analyte detection apparatus, electrophoresis apparatus, ultrasmall flow channels, and the like, which are useful for substantially isolating a constituent of a sample. Page 20, lines 1-3.

Each such separation apparatus includes at least one porous capillary column 14 formed in a substrate 12, with the substrate 12 being formed from silicon or another material that may be treated to form porous regions therein. Page 10, lines 21-22; page 11, lines 1-3. Each substrate 12 may include multiple porous capillary columns 14 which are formed by patterning the substrate 12. Page 16, lines 3-7. Each porous capillary column 14 further includes a matrix 16 formed from porous silicon (page 10, lines 22-23; page 11, lines 3-4) or hemispherical grain (HSG) silicon (page 18, line 22, to page 19, line 22).

A capture substrate or stationary phase 117 is bound to the matrix 16 at a reaction region 120. Page 15, lines 26-30. The capture substrate is an antibody, antigen, any other specific-binding molecule, or a material that separates the constituent from the sample based on the capture substrate's affinity for the constituent. Page 15, lines 21-23.

After being applied to the column, the sample is drawn through the porous capillary column 14 by movement of the mobile phase. Page 20, lines 7-11. The sample may migrate by capillary action or with assistance from a migration facilitator 24, such as a pump, vacuum

source, or electrical current generator. Page 13, line 18, to page 15, line 9. As the sample migrates through the porous capillary column 14, the constituents contained in the sample come into contact with the capture substrate 117. Page 21, lines 26-27. If one of the constituents has affinity for the capture substrate 117, the constituent will bind to the capture substrate 117, thereby isolating that constituent from the remainder of the sample. Page 21, line 27, to page 22, line 1. The constituents that do not have affinity for the capture substrate 117 continue to migrate through the porous capillary column 14. Page 21, line 27, to page 22, line 1.

A detector 22 or 122 detects the presence or absence of the constituent bound to the capture substrate 117. Page 22, lines 1-5. The detector 22 is located at the end of the capillary column or proximate to a reaction region 20 of each capillary column 14. Page 12, lines 16-17.

**VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

(A) Whether, under 35 U.S.C. § 112, first paragraph, independent claim 1 recites subject matter that has been adequately described in the specification of the '814 Application;

(B) Whether claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 are allowable under 35 U.S.C. § 102(e) for being drawn to subject matter that is not anticipated by the subject matter described in U.S. Patent 5,882,496 to Northrup et al. (hereinafter "Northrup");

(C) Whether, under 35 U.S.C. § 103(a), the subject matter to which claims 1, 5, 7, 8, 10, 11, 14, 15, 25-29, 111, and 112 are directed is allowable over the teachings of U.S. Patent 5,393,401 to Knoll (hereinafter "Knoll"), in view of teachings from Northrup;

(D) Whether claims 1, 3, 5, 6-11, 14, 15, 18, 22-24, 111, and 112 recite subject matter that, under 35 U.S.C. § 102(b) (apparently 35 U.S.C. § 103(a)), is allowable over the subject



matter described in U.S. Patent 5,605,662 to Heller et al. (hereinafter “Heller”), in view of the disclosure of U.S. Patent 5,693,946 to Vickers et al. (hereinafter “Vickers”) and, further, in view of the subject matter described in Northrup;

(E) Whether, under 35 U.S.C. § 102(e) (apparently 35 U.S.C. § 103(a)), claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, and 112 are drawn to subject matter that is allowable over the disclosure of U.S. Patent 6,379,929 to Burns et al. (hereinafter “Burns”), in view the subject matter disclosed in Northrup; and

(F) Whether claim 21 recites subject matter that, under 35 U.S.C. § 103(a), is allowable over teachings from Burns, in view of teachings from Northrup and, further, in view of the teachings of U.S. Patent 5,948,227 to Dubrow (hereinafter “Dubrow”).

## VII. ARGUMENT

### A. REJECTION UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

Independent claim 1 has been rejected under 35 U.S.C. § 112, first paragraph, for reciting subject matter that purportedly has not been adequately described in the specification of the above-referenced application.

#### 1. APPLICABLE LAW

The first paragraph of 35 U.S.C. § 112 provides, among other things:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same . . .

2. ANALYSIS

It has been asserted that the recitation of porous regions that comprise “the same material as [a] substrate” in independent claim 1 lacks support in the original specification of the ‘814 Application.

The as-filed specification, at page 7, lines 16-18, does, in fact, provide support for the recitation of porous regions that comprise “the same material as [a] substrate” in independent claim 1. Specifically, the originally-filed specification indicates that a substrate and porous capillary column may comprise the same material. More specifically, the originally-filed specification discloses that a substrate may be formed from silicon and that a porous capillary column therein may be formed from porous silicon or hemispherical grain silicon (*i.e.*, the substrate and the porous capillary column may be formed from silicon – the same material). As the originally-filed specification provides an adequate written description of porous regions “comprising the same material as the substrate,” independent claim 1 complies with the written description requirement of the first paragraph of 35 U.S.C. § 112.

It is, therefore, respectfully requested that the 35 U.S.C. § 112, first paragraph, rejection of independent claim 1 be reversed.

B. REJECTIONS UNDER 35 U.S.C. § 102

Each of claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 has been rejected under 35 U.S.C. § 102.

1. APPLICABLE LAW

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

2. REFERENCE RELIED UPON

Northrup

Northrup discloses a relatively thick, nonplanar substrate that includes internally confined porous columns. Northrup indicates that porous silicon may be used to provide increased surface area for chemical reaction chambers. Col. 2, lines 11-18.

3. ANALYSIS

The rejections of claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 under 35 U.S.C. § 102(e) are based on the assertion that the subject matter to which each of these claims is drawn is anticipated by the subject matter described Northrup.

Northrup does not expressly or inherently describe a sample separation apparatus that includes “at least one detector fabricated on [a] substrate . . .” or that such a detector may be “. . . in communication with at least one of . . . at least two porous regions” that extend at least partially across the substrate, as required by independent claim 1. Instead, the description of

Northrup is limited to a relatively thick, nonplanar substrate with internally confined porous columns that do not communicate with a detector. Thus, Northrup does not anticipate each and every element of independent claim 1, as would be required to maintain the 35 U.S.C. § 102(e) rejection of independent claim 1.

Each of claims 3, 4, 7, 11, 18, 22-24, 111, and 112 is allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Claim 7 is further allowable since Northrup lacks any express or inherent description of “a reaction region . . . situated along a length of and contiguous with at least one of . . . at least two porous regions.” Rather, the description of Northrup is limited to chemical reaction chambers (col. 2, lines 11-18) without any indication that the chambers themselves include reaction regions or that the chambers may be situated along or contiguous with a porous region that extends across a substrate.

It is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 be reversed.

C. REJECTIONS UNDER 35 U.S.C. § 103(a)

It appears that claims 1, 5, 7, 8, 10, 11, 14, 15, 21, 25-29, 111, and 112 have been final rejected under 35 U.S.C. § 103(a).

A. APPLICABLE LAW

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

B. ADDITIONAL ART RELIED UPON

Knoll

As shown in FIG. 11 of Knoll, the teachings of Knoll relate to apparatus that include capillary channels 34 with branches that terminate at containments 2. *See also*, col. 8, lines 61-64. Each containment 2 has a transistor (more specifically, an ion-selective field-effect transistor (ISFET)) associated therewith. *See, e.g.*, FIGs. 4-6; col. 7, line 1, to col. 8, line 12. As shown, the containments 2 are small, discrete structures that are filled with porous material, such as a hydrogel, PVC solution, or the like.

Heller

The teachings of Heller, like those of Knoll, relate to apparatus that include a matrix of discrete "micro-locations." Specifically, a device that includes an  $8 \times 8$  array of  $50 \mu\text{m}^2$  micro-locations was contemplated. FIG. 3; col. 12, lines 13-21. Heller teaches that

optoelectronic or microelectronic detection elements may be associated with each of the discrete micro-locations of that device. Col. 20, lines 42-51.

Vickers

Vickers has been relied upon merely for its teaching that CCD detectors comprise field effect transistors (FETs). Office Action of November 1, 2005, page 6.

Burns

Burns teaches apparatus that include two pieces that have been bonded together: a first piece with channels and other features for handling fluids and a second piece upon which electronic components, including sensors, are fabricated. Col. 21, line 24, to col. 22, line 13 (in particular, col. 21, lines 42-44). Burns notes that such two-piece structures are more desirable than single-piece structures, as they “give[] flexibility in choosing materials in one section of the unit without affecting other [parts] of that same unit.” Col. 21, lines 32-35. The teachings of Burns are limited to techniques in which two pieces must be used—channels are formed in the surface of a first substrate, then sealed by bonding an electronic component-carrying second substrate to the first substrate. Col. 22, lines 15-41.

3. ANALYSIS

a. KNOLL IN VIEW OF NORTHRUP

Claims 1, 5, 7, 8, 10, 11, 14, 15, 25-29, 111, and 112 are rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Knoll, in view of teachings from Northrup.

It is respectfully submitted that neither Knoll nor Northrup teaches or suggests a sample separation apparatus that includes “at least one detector fabricated on [a] substrate in communication with at least one of . . . at least two porous regions,” as recited in independent claim 1.

In this regard, it is noted that the teachings of Knoll are limited to apparatus that include transistors that communicate with porous containments rather than with porous regions that extend at least partially across a substrate. Specifically, as FIG. 11 of Knoll illustrates, the device disclosed therein includes capillary channels 34 with branches that terminate at containments 2. *See also*, col. 8, lines 61-64. While a transistor (more specifically, an ion-selective field-effect transistor (ISFET)) is associated with each containment 2 (*see, e.g.*, FIGs. 4-6; col. 7, line 1, to col. 8, line 12), the containments 2 are small, discrete structures that do not extend across the substrate 1 in which they are formed. Moreover, Knoll includes no teaching or suggestion that any feature with which the containments 2 communicate, which could also be reasonably considered to extend across at least a portion of the substrate 1 (*e.g.*, channels 34 or branches therefrom), may be filled with or otherwise comprise porous material. Thus, the transistors of Knoll do not communicate with a porous region that “extend[s] at least partially across the substrate [1].”

Northrup teaches structures that include porous elements that extend internally therethrough. As noted above, however, Northrup lacks any disclosure of a detector that communicates with any of these porous elements.

Thus, neither Knoll nor Northrop, taken either together or separately, teaches or suggests a sample separation apparatus that includes at least one detector that communicates with at least one porous regions that extends at least partially across a substrate, as would be required to render each and every element of independent claim 1 obvious under 35 U.S.C. § 103(a).

Claims 5, 7, 8, 10, 11, 14, 15, 25-29, 111, and 112 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Although the next two rejections have been characterized as anticipation rejections under 35 U.S.C. § 102, due to the Office's reliance upon two or more references in each rejection, they instead appear to be obviousness rejections under 35 U.S.C. § 103(a). Accordingly, the failure of the cited art to either anticipate or render obvious each and every claim element will be addressed.

b. HELLER, VICKERS, AND NORTHRUP

Claims 1; 3, 5, 6-11, 14, 15, 18, 22-24, 111, and 112 are rejected under 35 U.S.C. § 102(b) (apparently 35 U.S.C. § 103(a)) for reciting subject matter which is allegedly anticipated by the disclosure of Heller, in view of the disclosure of Vickers and, further, in view of the subject matter disclosed in Northrup.



As noted at pages 5 and 6 of the final Office Action (dated November 1, 2005), the teachings of Heller, like those of Knoll, are limited to apparatus that include a matrix of discrete “micro-locations.” Specifically, a device that includes an  $8 \times 8$  array of  $50 \mu\text{m}^2$  micro-locations was contemplated. FIG. 3; col. 12, lines 13-21. Although Heller discloses that optoelectronic or microelectronic detection elements may be associated with each of the discrete micro-locations of that device (*see* Office Action of November 1, 2005, page 6, *citing*, col. 20, lines 42-51), Heller does not teach or suggest that these detectors communicate with a porous region that “extend[s] at least partially across the substrate” in which the micro-locations have been fabricated.

Northrup teaches structures that include porous elements that extend internally therethrough, but lacks any disclosure of a detector that communicates with any of the porous elements of the structures thereof.

Vickers has been relied upon merely for its teaching that CCD detectors comprise FETs. Office Action of November 1, 2005, page 6.

In view of the foregoing, it is apparent that none of Heller, Vickers, or Northrup, taken either together or separately, teaches or suggests a sample separation apparatus that includes “at least one detector fabricated on [a] substrate in communication with at least one of . . . at least two porous regions,” as would be required to establish a *prima facie* case of obviousness against independent claim 1.

Each of claims 3, 5, 6-11, 14, 15, 18, 22-24, 111, and 112 is allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

c. BURNS IN VIEW OF NORTHRUP

Claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, and 112 stand rejected under 35 U.S.C. § 102(e) (apparently 35 U.S.C. § 103(a)) for reciting subject matter which is assertedly unpatentable over the disclosure of Burns, in view the subject matter disclosed in Northrup.

It is respectfully submitted that there are several reasons that teachings from Burns and Northrup cannot be relied upon to establish a *prima facie* case of obviousness against any of claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, or 112.

First, it is respectfully submitted that Burns teaches away from the subject matter recited in claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, and 112. In this regard, independent claim 1 is directed to a sample separation apparatus that includes a substrate with matrices formed therein and at least one detector fabricated thereon. Thus, the apparatus of independent claim 1 is a single-piece apparatus.

Burns, in contrast, emphasizes the desirability of apparatus that include two pieces that have been bonded together: a first piece with channels and other features for handling fluids; and a second piece upon which electronic components, including sensors, are fabricated. Col. 21, line 24, to col. 22, line 13 (in particular, col. 21, lines 42-44). Burns notes that such two-piece structures are more desirable than single-piece structures, as they “give[] flexibility in choosing materials in wonw section of the unit without affecting other [parts] of that same unit.” Col. 21, lines 32-35. Moreover, the teachings of Burns are limited to techniques in which two pieces must be used—a channels are formed in the surface of a first substrate, then sealed by bonding an electronic component-carrying second substrate to the first substrate. Col. 22, lines 15-41. Since Burns teaches away from a sample separation apparatus with matrices formed in and at least one

detector fabricated on the same substrate, as recited in independent claim 1, it is respectfully submitted that, without the benefit of hindsight that has been afforded to the Examiner, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Burns with teachings from Northrup or any other reference in such a way as to render obvious the subject matter recited in independent claim 1 or any of claims 3-5, 7-9, 13, 16-20, 22-27, 111, or 112 depending directly or indirectly therefrom.

Second, it is respectfully submitted that Burns and Northrup do not, together or separately, teach or suggest each and every claim element. With respect to the subject matter recited in independent claim 1, neither Burns nor Northrup teaches or suggests at least one detector fabricated on the same substrate within which at least two matrices have been formed.

As a *prima facie* case of obviousness has not been established under 35 U.S.C. § 103(a), the subject matter to which independent claim 1 is directed is allowable over the subject matter taught in Burns and Northrup.

Claims 3-5, 7-9, 13, 16-20, 22-27, 111, and 112 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

d. BURNS, NORTHRUP, AND DUBROW

Claim 21 has been rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is assertedly unpatentable over the subject matter taught in Burns, in view of teachings from Northrup and, further, in view of the teachings of Dubrow.

Claim 21 is allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

VIII. CLAIMS APPENDIX

The current status of each claim that has been introduced into the above-referenced application is set forth in CLAIMS APPENDIX to this Appeal Brief.

IX. EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132. Accordingly, no evidence appendix accompanies this Appeal Brief.

X. RELATED PROCEEDINGS APPENDIX

No decisions have been rendered by the Board or any court in a related application. Therefore, this Appeal Brief is not accompanied by a related proceedings appendix.

XI. CONCLUSION

It is respectfully submitted that:

(A) Independent claim 1 recites subject matter that has been adequately described in the specification of the '814 Application, in accordance with the written description requirement of 35 U.S.C. § 112, first paragraph;

(B) Claims 1, 3, 4, 7, 11, 18, 22-24, 111, and 112 are allowable under 35 U.S.C. § 102(e) for being drawn to subject matter that is not anticipated by the subject matter described in Northrup;

(C) Under 35 U.S.C. § 103(a), the subject matter to which claims 1, 5, 7, 8, 10, 11, 14, 15, 25-29, 111, and 112 are directed is allowable over the teachings of Knoll, in view of teachings from Northrup;

(D) Claims 1, 3, 5, 6-11, 14, 15, 18, 22-24, 111, and 112 recite subject matter that, under 35 U.S.C. § 102(b) (apparently 35 U.S.C. § 103(a)), is allowable over the subject matter described in Heller, in view of the disclosure of Vickers and, further, in view of the subject matter described in Northrup;

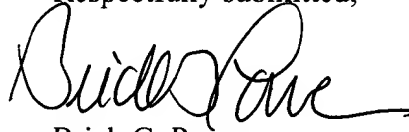
(E) Under 35 U.S.C. § 102(e) (apparently 35 U.S.C. § 103(a)), claims 1, 3-5, 7-9, 13, 16-20, 22-27, 111, and 112 are drawn to subject matter that is allowable over the disclosure of Burns, in view the subject matter disclosed in Northrup; and

(F) Claim 21 recites subject matter that, under 35 U.S.C. § 103(a), is allowable over teachings from Burns, in view of teachings from Northrup and, further, in view of the teachings of Dubrow.

**Serial No. 09/177,814**

Accordingly, reversal of the final rejections of claims 1, 3-11, 13-29, 111, and 112 is respectfully requested, as is the allowance of each these claims.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brick G. Power", written in a cursive style.

Brick G. Power  
Registration No. 38,581  
Attorney for Applicant(s)  
TRASKBRITT  
P.O. Box 2550  
Salt Lake City, Utah 84110-2550  
Telephone: 801-532-1922

Date: May 1, 2006  
BGP/eg  
Document in ProLaw



Serial No. 09/177,814

## CLAIMS APPENDIX

1. A sample separation apparatus, comprising:  
a substantially solid substrate;  
matrices formed in said substrate, the matrices comprising at least two distinct, unconnected  
porous regions comprising the same material as the substrate, each of the at least two  
porous regions extending at least partially across the substrate; and  
at least one detector fabricated on the substrate in communication with at least one of the at least  
two porous regions.
2. (Canceled)
3. The sample separation apparatus of claim 1, wherein each of the at least two  
porous regions comprises a capillary column.
4. The sample separation apparatus of claim 1, wherein each of the at least two  
porous regions linearly traverses the substrate.
5. The sample separation apparatus of claim 1, wherein one of the at least two  
porous regions extends only partially across the substrate.
6. The sample separation apparatus of claim 5, wherein one of the at least two  
porous regions comprises a control column.

7. The sample separation apparatus of claim 1, further comprising a reaction region immediately situated along a length of and contiguous with at least one of the at least two porous regions.

8. The sample separation apparatus of claim 7, wherein the reactant region comprises a capture component.

9. The sample separation apparatus of claim 7, wherein the reaction region is situated at a predetermined distance from an end of the at least one porous region.

10. The sample separation apparatus of claim 5, further comprising reaction regions situated immediately along lengths of each of the at least two porous regions.

11. The sample separation apparatus of claim 10, wherein a distance between a first of the reaction regions and an end of a first of the at least two porous regions is substantially the same as a distance between a second of the reaction regions and an end of a second of the at least two porous regions.

12. (Canceled)



13. The sample separation apparatus of claim 1, wherein the at least one detector comprises a thermal detector.
14. The sample separation apparatus of claim 1, wherein the at least one detector comprises a field effect transistor.
15. The sample separation apparatus of claim 1, wherein the at least one detector comprises a voltage application component and a current detection component.
16. The sample separation apparatus of claim 1, further comprising a processor on the substrate.
17. The sample separation apparatus of claim 1, further comprising a memory device on the substrate.
18. The sample separation apparatus of claim 1, further comprising a migration facilitator in communication with at least one of the at least two porous regions.
19. The sample separation apparatus of claim 18, wherein the migration facilitator comprises a pump in communication with a first end of the at least one porous region.

20. The sample separation apparatus of claim 19, further comprising a control valve situated between the pump and the first end.

21. The sample separation apparatus of claim 18, wherein the migration facilitator comprises a vacuum source operatively in communication with a second end of the at least one porous region.

22. The sample separation apparatus of claim 18, wherein the migration facilitator comprises a first electrode adjacent the first end of the at least one porous region and a second electrode adjacent a second end of the at least one porous region.

23. The sample separation apparatus of claim 22, wherein the first electrode is a cathode.

24. The sample separation apparatus of claim 22, wherein the second electrode is an anode.

25. The sample separation apparatus of claim 1, further comprising a stationary phase disposed in at least one of the matrices.

26. The sample separation apparatus of claim 25, wherein the stationary phase comprises a capture substrate.

27. The sample separation apparatus of claim 26, wherein the capture substrate comprises an antibody.

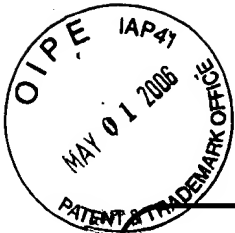
28. The sample separation apparatus of claim 26, wherein the capture substrate comprises an antigen.

29. The sample separation apparatus of claim 1, further comprising a sealing element situated over at least a portion of at least one of the at least two porous regions.

30-110 (Canceled)

111. The sample separation apparatus of claim 1, wherein the substrate comprises a semiconductor material.

112. The sample separation apparatus of claim 111, wherein the semiconductor material comprises silicon, gallium arsenide, or indium phosphide.



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(to be used for all correspondence after initial filing)	Application Number	09/177,814	
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**ENCLOSURES (check all that apply)**

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<b>Remarks</b> The Commissioner is authorized to charge any additional fees required but not submitted with any document or request requiring fee payment under 37 C.F.R. §§ 1.16 and 1.17 to Deposit Account 20-1469 during pendency of this application.		

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT**

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